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# USE AND EFFECT OF APPLICATIONS

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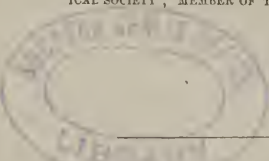
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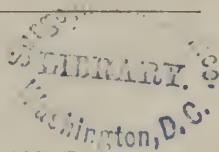
LOCAL OR GENERAL DISEASE.

By HORACE GREEN, M.D., LL.D.,  
(CHAIRMAN OF THE COMMITTEE,)

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[From the Transactions of the American Medical Association.]

Many years ago the celebrated Abernethy published to the world his treatise "On the Constitutional Origin of Local Diseases." His views have been pronounced enlightened and philosophical; and perhaps justly so. Certainly they were eminently suggestive, for they contributed, more than those of any other writer of that period, to awaken among both surgeons and physicians a spirit of enlightened inquiry with regard to primary diseased action.

But the great work needed now more than any other, by both branches of the profession, and which might be termed, perhaps, the converse of that of Mr. Abernethy, is one which would embrace a full, enlightened, and philosophical history of the *Local Origin of Constitutional Diseases*. Until this neglected portion of the history of Medicine shall have been written by some second Abernethy, thoroughly enlightened and imbued with the vast importance of his subject, the value of topical medication, its effects and utility, cannot be fully appreciated by the profession.

A brief history, only, of the therapeutic effects of a single agent locally employed in the treatment of disease, is doubtless the one expected by those from whom the appointment to report on this subject emanated; and yet the diseases in which topical medication has been already successfully employed, embrace a wide range, and include many of the most important affections which the physician is called upon to treat. Besides all that has been written in this country on the topical employment of nitrate of silver, several works of some magnitude, besides many monographs, have been published in Europe within a few years, which are devoted wholly or in part, to the history of the effects of this therapeutic agent in the treatment of disease. In reporting, therefore, on this subject, I shall refer primarily and mainly to the views and conclusions of others—to those which appear to be based on carefully recorded observations—believing that the value of my own views and opinions will be enhanced when these are sustained by the experience and the corroborative testimony of distinguished observers of my own and of other countries.

Among the works which have been published on topical treatment, or in which the use of nitrate of silver as a local therapeutic agent is discussed, are the following: “*Dysphonia Clericorum, or Clergyman’s Sore Throat, its Pathology and Treatment*. By James Mackness, M.D., member of the College of Physicians, London, &c., published in London, 1848.” “*A Treatise on Diseases of the Larynx and Trachea, and their Treatment by the Local Application of Caustics*. By John Hastings, M.D., Licentiate of the Royal College of Physicians, London, &c., 1850.”

A work on the Medication of the Larynx and Trachea, by S. Scott Alison, M.D., Member of the Royal College of Physicians, London, was published in 1853. And in the same year, Prof. Bennett of Edinburgh, published his work on Tuberculosis and on the Local Medication of Pharyngeal and Laryngeal Diseases.

But the most comprehensive and valuable publication on this subject, is the recent work of Dr. Watson, of Glasgow, Professor of the Institutes of Medicine in the Andersonian Uni-



versity, in which he declares his object has been to explain the rationale, and to recommend the practice of topical medication to the larynx, not only in those diseases which affect that organ simply and alone, but also in others during the progress of which it is secondarily involved in morbid action.\*

There are two other foreign works, having reference to diseases of the air-passages and their topical treatment, of which I might speak, both of which were published in London in 1851. The one by a member of the Royal College of Surgeons of England, the other by a Fellow of the Medical Society of London, &c. But as these volumes contain nothing on this subject, not recorded in my own work on *Diseases of the Air-passages*, published in 1846, I shall only allude to them in order to say, that however just the English may have been in accusing American writers of "pirating" and of borrowing largely from English authors, they are themselves not altogether immaculate in this respect. One of these authors has taken copiously from the above work, without the ordinary acknowledgment; whilst the other has made up a good-looking volume of nearly two hundred pages, on *Diseases of the Mucous Membrane of the Throat and their Treatment by Topical Medication*, a large proportion of which in its chapters on pathology, etiology, and treatment, is abstracted from my work; page after page of matter having been copied literally, without any intimation whatever as to its true paternity, and that too without those revisions and improvements which might have been made advantageously, with almost every sentence purloined.

Although many brief articles on the treatment of several of the diseases of the air-passages by means of cauterization, have from time to time appeared in our Medical Journals, yet no work, nor even a monograph, especially devoted to this subject, has ever been published by any one among my own countrymen.

Among the diseases, in the treatment of which the preced-

\* The Topical Medication of the Larynx in Certain Diseases of the Respiratory and Vocal Organs. By Eben Watson, A.M., M.D., &c., &c.

ing authors have recommended the employment of application of nitrate of silver, are the following: Follicular disease of the pharyngo-laryngeal mucous membrane, acute and chronic laryngitis, croup, œdema of the glottis, aphonia, whooping-cough, spasmodic asthma, chronic bronchitis, laryngismus, and tuberculosis, especially when the latter affection is consequent on or complicated with laryngeal disease.

Now, the question very appropriately presents itself, on what principle in rational or scientific medicine, is that practice founded by which several diseases, diverse in their indications, can be successfully treated by the employment of a single topical remedy?

Dr. Watson, in his recent valuable work, to which I have alluded, in considering the *modus operandi* of this local stimulant, in the treatment of inflammations of the mucous membrane, offers an interesting rationale of that treatment, showing its applicability to many diseases, which at first sight are essentially different; "as different, for example, as whooping-cough and laryngitis, or as either of these and aphonia."

All practitioners who have used this local remedy to any extent, have found it highly important to vary the strength of the solution in different cases, and also according to the condition of the diseased membrane. When a solution of nitrate of silver of moderate strength is applied to the mucous membrane, it acts chemically on the mucus with which it comes in contact, and throws down a copious white deposit that coats the membrane beneath.

"In erosion and ulceration of the mucous membrane," says Dr. Watson, "the deposit of the white substance before alluded to, from the caustic solution, is thickened by coagulation of the albumen of the *liquor sanguinis*, which transudes from the exposed vessels, and thus protection is afforded to the delicate and inflamed parts beneath."\* The therapeutic effect which follows the stimulation produced in the vessels of the parts, by the application of the argentine solution, he explains by a reference to the action of this remedy, on the different degrees and stages of that inflammatory process, which is artifi-

\* Op. citat., p. 32

cially produced in the web of a frog's foot, stretched out under a microscope.

When, for example, he says, "a red-hot needle is passed through the web, the following are the phenomena observed: A spot in the centre of the inflamed part is sphacclated, destroyed by the passage of the needle through it; a circle around the spot is usually found in a state of complete congestion, the vessels being dilated and the corpuscles almost perfectly stationary within them, while in the part beyond this circle, the vessels are not so much dilated, and the stasis of their contents is not so complete. The stream is seen passing slowly away into the collateral circulation of the unaffected parts of the web."

"Now these two circles represent two degrees of inflammation, which it is important to distinguish wherever they occur, and perhaps especially when the seat of morbid action is the mucous membrane of the larynx or trachea. That part of the web of the frog's foot in which the stasis was complete, represents the most intense, or sthenic degree; the other, in which the stasis was not so complete, represents what is usually called the subacute, and perhaps chronic varieties. And the effects of the solution of caustic on each of these parts, is markedly and importantly different. In the part which is most intensely inflamed, the solution in the direct ratio of its strength increases the stasis of the blood within the vessels. The latter seem to be unable to dilate further, and are, therefore, little changed, but the nitrate of silver acts through the coats upon the blood which they contain by causing its partial coagulation, and likewise by withdrawing water from the serum for the crystals of the nitrate which begin partially to form if the solution is strong. In that part of the web, on the other hand, which had been less intensely inflamed, the stimulant solution causes a renewed and increased dilatation of the blood vessels, and the retarded current moves on in them more freely than before; a cure being thus speedily effected if the exciting cause of the inflammation has ceased to act."\*

From these experiments Dr. Watson believes we are war-

\* Op. citat., pp. 32-3.

ranted in concluding that the purely stimulant action of this remedy is beneficial, in all varieties of the inflammatory process, except the most intense ; and that a strong solution not only stimulates the vessels, but tends, as in the different varieties of œdema, to remove the watery part of their contents, on the laws of *exosmose* and *endosmose*.

Prof. Bennett of Edinburgh, on the other hand, declares in his recent work on *Pulmonary Tuberculosis*, that "the action of the nitrate of silver solution is not that of a stimulant, but rather that of a calmative or sedative. It acts chemically on the mucus, pus, or other albuminous fluids it comes in contact with, throws down a copious white precipitate, in the form of a molecular membrane, which defends, for a time, the tender mucous surface, or irritable ulcer, and leaves the passage free for acts of respiration. Hence the feeling of relief almost always occasioned ; that diminution of irritation in the parts, which is so favorable to cure, and why it is that strong solutions of the salt are much more efficacious than weak ones."\*

Dr. S. Scott Alison, in his work on the *Medication of the Larynx and Trachea*, expresses the opinion that the nitrate of silver, when applied to an acutely inflamed organ, is an irritant, and may aggravate the morbid condition. "To a part affected with chronic inflammation," he says, "it is a tonic and a stimulant, and therefore is likely to be beneficial. To a tissue, the subject of irritation, it is a sedative. Applied to a membrane, which for some time has been the seat of excessive and unhealthy secretion, it abates and corrects it."\*

These are the opinions of a few of the distinguished members of the profession—men who have had the largest experience in the use of the remedy—of the therapeutic action of the nitrate of silver solution, in the treatment of diseases of the lining membrane of the air-tubes.

I shall now proceed, in as brief a manner as possible, to

\* The Pathology and Treatment of Pulmonary Tuberculosis ; and on the Local Medication of Pharyngeal and Laryngeal Diseases, frequently mistaken for, or associated with, Phthisis. By John Hughes Bennett, M.D., F.R.S.E., &c., &c., p. 140.

\* The Medication of the Larynx and Trachea. By S. Scott Alison, M.D., &c., pp. 10, 11.

specify some of the most important of the local and general diseases which have been enumerated, in the treatment of which the Use and Effect of Nitrate of Silver have been observed and recorded.

1st. *The Effect of Nitrate of Silver in the Treatment of Follicular Pharyngo-laryngeal Disease.*

In advocating the employment of topical medication, in the treatment of diseases of the air-passages, in the work to which I have alluded, I state that, "in the simple and uncomplicated form of follicular pharyngo-laryngeal disease, however severe the local affection may have been, this remedy alone, namely, the crystals of nitrate of silver topically applied, has proved in my hands a specific in a large number of cases." \*

This opinion of the efficacy of the remedy in this disease, has been fully sustained by subsequent experience, in the practice of many distinguished physicians in this and in other countries. It is well known that Prof. Bennett, of the University of Edinburgh, has adopted extensively topical medication in the treatment of laryngeal and kindred diseases, in the Royal Infirmary, and in his private practice.

In his treatise on *Pulmonary Tuberculosis and Laryngeal Affections*, much valuable information on this subject, and many interesting cases, successfully treated by the applications of nitrate of silver, are given. I shall take the liberty of noting the following

CASE.—"I was requested by an assurance office, in July, 1850, to examine the chest of Mr. M——, a merchant, aged about 30, who said he labored under no kind of complaint, with the exception of occasional sore throat, and expectoration of mucus tinged with blood. He was tolerably stout, took long walks without uneasiness, and suffered from no difficulty of respiration or from cough. Repeated examination of his chest failed to elicit any physical sign indicative of pulmonary disease. I therefore certified that his lungs were healthy. In October, 1851, this gentleman called upon me again for advice, under the following circumstances. The soreness of the throat had lat-

\* A Treatise on Diseases of the Air-Passages, &c., p. 213.



terly increased, and considerable cough was induced, after which he spat up mouthfuls of purulent matter, frequently tinged of a red color. He brought me some of this sputum to examine, which consisted of mixed blood and pus, of a dirty brick-red color. Examination of his chest again convinced me that the lungs were unaffected ; but in the interval I had paid attention to the writings and practice of Dr. Horace Green, of New York ; and I now examined his throat, when the cause of his symptoms was at once apparent. The fauces and upper part of the pharynx were studded over with nodular swellings, varying in size from a pin-head to that of a pea. Many of them were bright red, and fungoid in character, probably the origin of the extravasated blood, whilst considerable patches of purulent matter adhered to several parts of the mucous membrane. I applied a sponge, saturated with a strong solution of the nitrate of silver, to the affected parts. In three days he returned, having been much relieved, when the application was repeated. I have not seen him since.

“These two cases (a second case being recorded by Dr. B., not quoted) convinced me that certain symptoms which have hitherto been considered as indicative of phthisis, might have their origin entirely in the fauces, pharynx, and upper part of the larynx. The cough, so occasioned, with the purulent expectoration, often tinged with blood, frequently so resembles that occasioned by phthisis, as not only to induce alarm in the minds of the patients, but frequently to mislead the medical practitioner. I have now met with many such cases, which have been mistaken for phthisis, and which have been treated for that disease without any effect, until local remedies were applied, when they, for the most part, disappeared or became much better.” \*

Dr. Bennett enumerates other cases of follicular disease, where all the symptoms of phthisis pulmonalis were present, including emaciation, profuse sweating, cough, expectoration of pus mingled with blood, bad appetite, hectic ; and, in consequence, cod-liver oil, cough mixtures, acid drops, wine and good diet were administered, and all without effect ; “but which in many instances were cured by the topical applications.”

\* Op. citat., p. 128.

2d. *The Effect of Nitrate of Silver in the Treatment of Acute and Chronic Laryngitis.*

Dr. Hastings, in his excellent *Treatise on Diseases of the Larynx and Trachea*, expresses great confidence in the use of the nitrate of silver, as a local remedy in the treatment of these affections; and he also details many cases of much interest, in which topical medication proved effectual in arresting the disease, after other measures had failed. Under the head of "Follicular Laryngitis," Dr. Hastings alludes to a pathological condition of the larynx and trachea, which, as an independent affection, is very generally overlooked by the profession, or, is considered the sequel—not, as it often is, the antecedent of tuberculosis. "I am satisfied," says Dr. Hastings, "that cases presenting the morbid appearances in the pharynx and arch of the fauces just described, form but a small proportion of those denominated follicular laryngitis."\* \* \* \* \*

"I have repeatedly met with cases in which the disease was confined to those parts, and the back of the velum, where nothing more was required than to carry the solution of the nitrate of silver behind the uvula into the posterior nares, and over the pharynx and fauces, in order to remove a very troublesome cough; whilst in others, and by far the greater number, the disease exists in the larynx and trachea, the fauces and pharynx at the same time presenting a healthy appearance.

"Such cases are, generally, most puzzling to the practitioner. The patient is troubled with cough, the expectoration is mucopurulent, occasionally streaked with blood, to a considerable amount; pains are felt in the chest below the clavicles, he wastes a little, or he may not lose flesh. His chest is examined again and again, but no disease can be discovered; his mouth and throat are inspected without anything being found there to account for the symptoms; at length the disease is regarded as an obscure case of phthisis; he gets treated with sedatives, expectorants, and cod-liver oil, until the ensuing Winter, when all his former symptoms return in an aggravated degree, whilst as the warm season comes on, they improve."

\* A Treatise on Diseases of the Larynx and Trachea. By John Hastings, M D., &c. London, pp. 115.

"Much pain and suffering might be spared in these cases, were a stethoscopic examination of the windpipe resorted to, which in most cases would point out the nature, situation, and extent of the disease; and the practitioner would have that satisfaction in treating the case, which an imperfect knowledge or an entire ignorance of it can never give." \*

Such cases are reported by Dr. Hastings as having been successfully treated by the repeated application of the sponge, saturated with a solution of the nitrate of silver, and which was "carried down the windpipe," he says, "as low as the bifurcation of the bronchi."†

In speaking of the practicability of this operation, and of the benefit to be derived from topical medication in disease of the larynx, Prof. Bennett declares, that if the probang be properly prepared, and the operation well performed, the sponge saturated with the solution of nitrate of silver may be rapidly thrust through the rima into the larynx and frequently into the trachea. "I am persuaded," he continues, "that on many occasions, I have passed it pretty deep into the trachea, not only from the length of the probang which has disappeared, but also from the sensations of the patient. ‡ \* \* \* In this first part of the operation, the rima glottidis is, as it were, taken by surprise, and the sponge enters, if the right direction be given to it, without difficulty; the rima glottidis immediately contracts by reflex action, so that on withdrawing the instrument you feel the contraction."

"This also squeezes out the solution, which is diffused over the laryngeal and tracheal mucous membrane. Now if the sponge be a fine one, it will be found capable of holding about half a drachm of fluid, the effect of which upon the secretions and mucous surfaces, almost always produces temporary relief to the symptoms, and strengthens the tone of the voice; results at once apparent after the momentary spasm has abated."

In the treatment of both varieties of chronic laryngitis, the idiopathic and the tubercular, topical applications of the nitrate of silver solution have proved, in the hands of many practitioners, a most efficient and valuable remedy.

\* Op. citat., pp. 116-7.

† Op. citat., p. 119.

‡ Ib., pp. 139, 140.



Dr. Cott<sup>4</sup>, one of the physicians of Brompton Hospital, in the work to which I have alluded, in speaking of topical medication in chronic laryngitis and laryngeal phthisis, candidly admits his previous unbelief in, and changed views with regard to the practicability or propriety of topical medication to the mucous membrane of the respiratory passages. The admission is honorable to himself, and worthy of imitation. "I should here remark," he observes, "that my own views upon this subject differ from those I formerly held and have even expressed; and that I owe this change to the kindness of Dr. Horace Green of New York, the justly celebrated advocate of this treatment, who, during a recent visit to our metropolis, convinced myself and others, not only of the possibility, but of the safety and usefulness of the practice.

"I had long been in the habit of using a solution of nitrate of silver to the pharynx and upper surface of the epiglottis, by means of a soft brush, in all the early cases, both of pharyngeal and laryngeal complication; and had frequently witnessed its good effects, not only upon the part to which it was immediately applied, but upon the laryngeal structures also, attributing it in the latter case to an action excited in the upper respiratory passages from continuity. But I had never ventured to apply anything directly to the larynx itself; not from misgivings as to its effects, but from apprehensions of its danger. For some months past, however, I have done so, extensively in cases of chronic laryngitis, whether idiopathic or tubercular, and very frequently with marked success.

"At the commencement of the laryngeal symptoms, a solution of the crystals of nitrate of silver, varying in strength from ten grains to half a drachm to the ounce of distilled water, passed by means of the instrument recommended by Dr. Green, into the opening of the larynx, is often productive of great relief. I have known the voice regained, the irritable cough removed, and the tenderness and difficulty of swallowing dissipated entirely by it; indeed, I think we might almost speak of its *curative* effects, so far, at least, as the larynx is concerned, in some very early cases." \*

\* Op. citat., pp. 236-7.

"In the treatment of acute laryngitis," says Dr. Hastings, "the topical application of a solution of the nitrate of silver may sometimes be employed with great advantage; indeed, unaided, it will not unfrequently remove the disease, but then the patient must be seen sufficiently early.

"If the inflammation has not penetrated into the trachea, but is confined to the larynx, we may safely and successfully venture to employ this topical application; for although a small spot of intense inflammation may be safely and successfully treated in this way, a large surface is irritated by the same means.

"This treatment would not interfere or prevent the use of any additional remedies, such as calomel, opium, aperients," &c. "But it is in the chronic form of laryngitis," Dr. Hastings continues, "that this treatment is remarkably useful. Many such cases improve rapidly under local treatment applied to the larynx and trachea, which, if neglected for months, or it may be for years, not unfrequently lead to permanent changes." \*

In this connection Dr. Hastings relates some most interesting cases of chronic laryngitis, attended with hoarseness, cough, emaciation, "expectoration streaked with blood," difficulty of breathing, night-sweats, and most of the ordinary symptoms of phthisis—all of which were promptly and permanently relieved by a solution of nitrate of silver of the ordinary strength applied to the larynx and trachea.† With regard to the treatment of *tubercular laryngitis*, Dr. Hastings remarks, "I know of no means so capable of arresting and removing it, as sponging the windpipe with a solution of the nitrate of silver." ‡

In the treatment of the non-exudative variety of chronic laryngitis, Dr. Watson has employed and recommends the application of the nitrate of silver to the inflamed mucous membrane; but he considers that a great amount of discrimination is necessary in the adaptation of the strength of the solution to the severity of the inflammation which may be present; as well as in the preparation for commencing the topical measures. In the severe forms of the affection, he believes that depletion of some kind will at first be necessary

\* Op. citat., pp. 79, 80, 81.

† Ib., p. 85 et seq.

‡ Ib., p. 130.

to check the violence of the inflammation before the applications of the caustic solution are made to the laryngeal membrane;\* and with regard to the strength of the remedy employed, he maintains that the more intense the degree of inflammation of the laryngeal lining, the weaker ought to be the solution of the nitrate of silver applied to it.†

After the intensity of the primary inflammation has been subdued by appropriate treatment, a stronger solution may be used with advantage. "Its first effect," he continues, "when thus judiciously applied will be to coagulate the albuminous film upon the surface of the membrane which had been stripped of its epithelium, and to secrete new mucus, and thus the artificial film of coagulated albumen is by and by replaced by a more natural covering, and the surface is lubricated by its appropriate moisture.

"If, then, a renewal of the morbid process could be prevented, a cure would already have been effected, but this is seldom or never the case. The good effects of the topical application wear off in a few hours, and the former abnormal phenomena may even in that time have reappeared in nearly equal severity. The treatment must therefore be continued; the touching of the larynx must be repeated frequently for some days; and indeed, until all the symptoms of laryngitis have completely disappeared."‡

Many practitioners both in this country and in Europe, differ entirely from Dr. Watson, with regard to the strength of the solution to be employed in the treatment of different degrees of inflammation of the mucous membrane. The weaker solutions, they believe, those for example of the strength of five, ten, or fifteen grains to the ounce of water, act as a stimulant, or as an irritant when applied to a highly inflamed membrane; while a strong solution, by the chemical changes it effects, will prove a sedative, and thus tend directly to subdue the violence of the inflammatory action.

On this point, as we have seen, Prof. Bennett expresses the decided opinion, after much observation and experience in the topical use of the nitrate of silver solution, in the treatment of

\* Op. citat., p. 40.

† Ib., p. 41.

‡ Op. citat., p. 41.

inflammations of the lining membrane of the larynx and trachea, that strong solutions of the salt, by acting as a calmative or sedative, diminish the irritability of the inflamed parts, and are therefore much more efficacious than weak ones.\*

Dr. Watson, in his treatise, has devoted many pages to the consideration of chronic laryngitis. "In the treatment of chronic disease of the laryngeal mucous membrane," he remarks, "I place my chief reliance on topical applications to the parts affected, but I do not undervalue or neglect more general measures." The strength of the solution, he adds, "should vary with the requirements of the case, and it should be applied every day, or every second day, according to the patient's feelings."†

Dr. Alison, in the work to which I have referred, on the *Medication of the Larynx and Trachea*, details his experience in the employment of other agents beside nitrate of silver, for the treatment of local diseases; such as Atrophine, Daturine, Iodine, &c., but he gives the preference to the first named remedy, as the one most efficient. "I had so frequently found," he remarks, "in the treatment of local disease, and local complications, that many remedies were far more efficacious, when applied immediately to the part affected or to its vicinity, than at a distance, that I was glad to learn that a sponge loaded with the solution of the nitrate of silver, and affixed to a probang, could, not only without injury, but with manifest advantage, be passed through the glottis and the larynx down into the trachea."‡

In acute inflammation of the glottis, Dr. Alison has hesitated to apply the solution, lest "the presence of the stimulant on parts suffering from such attacks," might aggravate the disease; but in chronic inflammations of the larynx, "and of the upper portion of the trachea, the solution of the nitrate of silver, he observes, has in my hands as in others, been very useful in bringing the disease to a conclusion; and where that has not been accomplished by reason of its dependence upon incurable disease of the lungs, it has almost invariably afforded very considerable relief, by rendering the cough less violent and fre-

\* Ib., p. 140.

† Ib., p. 85 et seq.

‡ Op. citat., pp. 23.

quent, and removing much of the tickling and uneasy sensations, at the upper portion of the larynx." \* \* \* \* "In some cases of disease of the larynx and trachea," he continues, "in which the symptoms inclined to the suspicion that ulceration existed, the same local application of a solution of the nitrate of silver has been very useful."<sup>\*</sup>

Abundant testimony from many other sources might be gathered, if necessary, to prove the great advantage to be obtained from the topical use of this remedy, in the treatment of laryngeal and tracheal disease.

### 3d. *The Effect of the Application of Nitrate of Silver in the Treatment of Membranous Croup.*

As a difference of opinion obtains, to some extent, among the profession, with regard to the propriety of employing topical applications of the nitrate of silver in *exudative laryngitis*, or croup, I shall examine with some care the opinions and observations of those who have had extensive opportunities to test its efficacy in the treatment of this often fatal malady.

According to the testimony furnished by Prof. Trousseau, of Paris, M. Bretonneau, the preceptor of Trousseau, was the first to employ topical medication in the treatment of membranous croup. Prof. Trousseau, in a letter which I received from him, and which was published in the January number of the *American Medical Monthly*, thus writes: "As early as 1818, M. Bretonneau, in the treatment of croup, carried over the aryteno-epiglottic ligaments, several times a day, a sponge fastened to the extremity of a piece of whalebone and charged either with pure chlorohydric acid, or with a saturated solution of nitrate of silver. He expressed the fluid from the sponge at the entrance of the larynx, and the patient in the convulsive movements of respiration caused a certain quantity of the caustic solution to enter therein."<sup>†</sup>

In 1830, M. Trousseau employed for the first time caustic applications in the treatment of diseases of the larynx. "I made use," says M. Trousseau, "precisely of the same process which I have pointed out above, in the treatment of croup, and

\*<sup>1</sup>Ib., pp. 7 and 8.

† *American Medical Monthly*, Jan. 1855, p. 9.



I endeavored to express the caustic solution into the cavity of the larynx." In this connection Prof. Trousseau asserts, "that never, either before or since the publication of your labors, have I attempted to introduce into the larynx or trachea, a sponge saturated with a caustic solution," \* \* \* "and consequently," he continues, "the direct introduction of the sponge saturated with a caustic solution, into the larynx and into the bronchial tubes, does not belong to me in any respect whatever." \*

This local agent has also been employed after the manner of Bretonneau, in the treatment of pseudo-membranous croup, by MM. Dupuytren, Guersant, Guet, Bouchut, Berton, and other French practitioners, but no one of the number made any attempt to pass the sponge probang into the larynx.

M. Bouchut, whose work on *Diseases of Children* was published in 1845, advises the employment of cauterizations, in the treatment of the disease, but he observes and recommends great caution in making the applications to the pharynx, and over the glottis, lest too large a quantity of the fluid *should drop into the larynx, and produce suffocation and death*, or at least render it necessary to practice immediate tracheotomy. The following are M. Bouchut's remarks on this subject: "Si la cauterization de l'arrière—bouche et de la partie supérieure du larynx est avantageuse, elle a aussi ses inconvénients qu'il faut connaître pour tâcher de les éviter. La suffocation immédiate peut en être la conséquence, si l'on a laissé trop long temps l'éponge sur la glotte, et si une trop grande quantité de liquide a pénétré dans la larynx. Cet accident est fort grave, car il peut déterminer la mort, ou au moins la nécessité de pratiquer aussitôt la trachéotomie."†

A late number of the *Archives Générales de Médecine* contains an interesting Memoir, by M. Vauthier, on the history of Croup, as it occurred in an epidemic form, in *L'Hôpital des Enfants Malades de Paris*. In this paper are the details of several well marked cases of membranous croup, which were treated successfully by "emetics and cauterizations;" and although in these

\* See American Med. Monthly, Vol. III, pp. 9-10.

† Manuel Pratique des Maladies des Nouveaux-Nés, et des Enfants à la Mamelle, p. 272.

instances, the argentine solution was not conveyed into the larynx, but was applied only to the fauces and pharynx, yet the patients recovered perfectly under the treatment.\* Although the cases thus treated are characterized as having been very severe—"très intense"—yet, as the treatment was early adopted, it is probable that the exudative process had not extended into the larynx; for, in the same paper is a history given, of five other cases of membranous croup, in which the disease, having reached the larynx, was not arrested by cauterizations. This method was employed, as in the other cases, but no attempt was made to pass the instrument below the epiglottis. Tracheotomy, however, was resorted to in all these five cases, but every patient died. Efficient cauterization of the larynx, we maintain, would have saved three, if not more of these last cases.

Among the English practitioners, of whose works, on topical medication, we have spoken, a few only appear to have employed this remedy in the treatment of true exudative croup. Dr. Watson's exudative experience, in the treatment of the few cases he has reported in his work, has led him to the conclusion, "that the topical treatment is unsuitable during the acute stage of exudative croup."

Having been unsuccessful in the management of a single case of membranous croup,† in which he employed the treatment through the acute or inflammatory stage of the disease, Dr. Watson adopts and promulgates the above opinion. In the commencement of the disease, or in that stage of the affection denominated by him "the pre-exudative stage of croup," Dr. Watson highly recommends the application of the solution of nitrate of silver to the throat and larynx. Omitting the applications during the acute stage of the disease, he renews the topical measures, as soon as the inflammatory process has been

\* Archives Générales de Médecine, tome xix., art. 1st.

† The only other case mentioned by Dr. Watson, as one not benefited by the topical treatment, is that of a gentleman past the middle period of life, "who on a Winter evening," was suddenly seized with difficult respiration, tightness in the throat, harsh, dry, whistling cough, and high fever, "whilst the physical signs were: Inspiration long in the trachea, and accompanied by a harsh sound of the air passing along the dry and narrowed tube." Symptoms, manifestly indicative of *acute laryngitis*, and not as Dr. Watson supposed, of "*ACUTE TRACHEAL CROUP*, accompanied by exudation."—*Op. citat.*, p. 51.

subdued by appropriate reducing measures. But his view on this subject will be best understood from the following brief extract from his work: "There is a large class of cases, in which the croup commences by a longer or shorter stage of simple, though severe inflammation of the laryngeal membrane. This inflammation differs in nothing from the most intense degree of catarrh, formerly described; but it speedily ends either in exudation upon the surface of the membrane, or in serous effusions beneath it.

"The suddenness of the attack, the anxiety of the patient, the severity of the constitutional fever, and above all, the stethoscopic signs of a dry and tense glottis, never fairly released at any stage of respiration, are the chief diagnostic marks of the danger to be expected in the next stage of the disease. No one who has ever listened attentively to the peculiarly harsh sounds transmitted through the stethoscope placed over the thyroid cartilage of a patient in the critical state we are now considering, can either forget or mistake the prolonged and dry, but vibratory sound during inspiration, immediately followed by less noisy, though still grating murmur of obstructed expiration by which it is characterized. Then the stifling and painful cough, without expectoration, and the whispering, not hoarse voice, are equally characteristic.

"In children, or in adults predisposed to the disease, such a group of symptoms as that just referred to, may be considered as certainly indicative of the first stage of exudative croup. But no exudation has yet been poured out, and according to my experience, the disease may here be checked by the application of an appropriately strong solution of the nitrate of silver; and I will venture to assert, it is in the treatment of this pre-exudative stage of croup, if I may be allowed so to name it for sake of brevity, that Dr. Horace Green has also been successful."\*

This abortive treatment of croup by topical applications, is further illustrated by Dr. Watson, in his relation of the subjoined case: "It is that of a family of young children," he says, "all of whom are remarkably subject to croup, and, notwithstanding the utmost care in their management, some of them

\* Op. citat, pp. 49, 50.



have suffered once or twice from the disease during the Winter, for some years past. In the beginning of the present year, I attended two of them, and, within the last few days, a third, when attacked by this disagreeable visitant.

"Whenever a croupy cough is heard in this family, the throat and larynx are at once touched with the solution of caustic. A warm bath, a few drops of antimonial wine, and, if necessary, a dose of laxative medicine, are next had recourse to, and very little else is generally required. The throat is touched for the two or three succeeding days, by which time the child is usually quite well.

"Only once that I remember did this abortive treatment fail in my hands, and it was in the case of a member of the family here referred to. The weather was at the time very severe, and the subject of the disease, a strong little boy about six years of age. For some reason or other, it was longer than usual, too, before the topical application was made to the larynx, and it failed. Exudation was thrown out, and the boy passed through a critical illness, during the intensity of which I laid aside the topical treatment, and employed leeches, calomel, and antimony. But when, as happily occurred in this case, the exudation had separated in due time, I renewed the stimulant applications to the windpipe, with marked benefit, and the child made a speedy and perfect recovery."\*

In one other respect Dr. Watson differs from most practitioners in this country, namely, in the strength of the solution which he employs in the treatment of croup. He has found in practice, he says, that a solution "of fifteen or twenty grains to the ounce of water, is abundantly successful in fulfilling the indications of the disease."†

Although a prejudice against the local treatment is still entertained by many practitioners, applications of the nitrate of silver in the treatment of membranous croup have been employed, with more or less success, by physicians in every part of this country. Contributions from the profession have been made from time to time to most of our medical journals, during the last ten years, in which cases successfully treated by this agent

\* Op. citat., pp. 51, 52.

† Ib., p. 51.

are detailed. I will refer only to the opinion and observations of one of these writers, a distinguished permanent member of this Association ; it is well known to the reading members of the profession, that several years ago, Dr. Ware, of Boston, published his contributions to the "History and Diagnosis of Croup"—a work evincing more scientific research, and containing more information with regard to the true pathology of membranous croup, than all that had previously been written in America. In these papers, Dr. Ware refers to thirty-nine cases of what he denominates membranous croup, which were noticed in his own, or in the practice of his friends. Of these cases the state of the fauces was observed in thirty-three instances, and "in thirty-two, a false membrane was present; most frequently, and sometimes only, on the tonsils, sometimes on other parts also, as the palate, uvula, and pharynx. In one case no such membrane was present; but it was found to exist in the larynx after death. These thirty-three cases were treated by the ordinary therapeutic measures; and of the whole number *three* only recovered; in thirty the disease proved fatal." It is not at all surprising that, under these circumstances, Dr. Ware, eminent for his careful investigation and conscientious inquiry after truth, should have become "confirmed in the opinion," as he subsequently declares himself to have been, "that the methods of treating this disease, in common use, require a careful reconsideration;" nor, that he should have propounded the question: "If the mode of treating croup commonly adopted, does no good, are we sure that it does no hurt?"

Having concluded after the experience to which we have referred, to treat the disease "without the preserving use of the heroic remedies," Dr. Ware subsequently adopted a method in which the treatment consisted—

1. "In the absence of all reducing, depleting, and disturbing remedies.
2. "Keeping the patient under the full influence of opium combined with calomel.
3. "Constant external application of warmth and moisture (to the neck), and of mercurial liniment, slightly stimulating.
4. "Constant inhalation of watery vapor."

In March, 1850, Dr. Ware read before the Suffolk District Medical Society, "*Additional Remarks on the Treatment of Croup*," in which paper he refers to five cases of membranous croup, three of which were treated on the method indicated in the preceding propositions; and in the other two cases, in addition to these general measures, applications of a solution of nitrate of silver were made into the larynx. The first three cases which received general treatment only, proved fatal; yet they "exhibited," says Dr. Ware, "certain differences from the common course of this disease which indicated a favorable influence from difference of treatment."

"In all of them the membrane was thrown up in considerable quantities.

"In all of them the disease was attended by very much less distress than is usual in croup; and, in two, there was so decided a mitigation of symptoms following the separation of the membrane, as to lead to considerable hope of a favorable termination.

"In two, at least, the disease was prolonged to at least twice its average duration under the usual treatment.

"In the other two cases, to which reference was made, the same general course of treatment was followed, with the addition of the introduction of the sponge, wet with a solution of the nitrate of silver, into the larynx. In each of these cases the application was made as early in the disease as I became satisfied of its distinct character. It was repeated morning and evening. It decidedly gave relief to the breathing, soon after each application, and both cases ultimately recovered perfectly. For the suggestion and adoption of this valuable addition to our means of treating this formidable disease, we are indebted, as is well known, to the enterprise of Dr. Horace Green, of New York. The profession, I think, owe to him a large debt of gratitude, for the energy and perseverance manifested in the introduction of this remedy, and I am the more disposed to render this tribute, to him, because so many attempts have been made to detract from his merit in relation to it."

"I am well satisfied from what I have now seen of this method of treating croup, as compared with that which has been follow-

ed for so many years, that it has the advantages which were pointed out in one of the preceding papers. It is a disease which I would treat without depletion, except, perhaps, by a few leeches—without vomiting, without purging, without blisters, without antimonials, ipecac., and all those other nauseous remedies which have been usually resorted to. I would trust to opiates, perhaps calomel, emollients, and the local application of the nitrate of silver.” “I ought to add that many of my friends in the profession have informed me of cases in their practice, treated on these principles, which have recovered in a favorable manner.”\*

Since the publication of Dr. Ware's papers, cauterization of the larynx, in the treatment of membranous croup, has been adopted by large numbers of medical men in New England, as well as in other places in the United States, from many of whom we have received communications on this subject, expressing their full confidence in this therapeutic agent, when timely and appropriately employed in the management of croup.

Should we give the history of a tithe of these cases, which have been thus reported to us, they would occupy a much larger space than can be appropriated to this subject.

In 1848 the chairman of this committee published a small treatise “*On the Pathology of Croup, and its Treatment by Topical Medications,*” in which the declaration was made that “the practice of making topical applications of medicinal agents into the larynges of young children, for the treatment of membranous croup, is a plan entirely practicable, safe, and when judiciously employed, *in the highest degree efficacious.*” This method of treating a disease hitherto so unmanageable was founded, among others, upon the following propositions (which were then advanced, with regard to the pathology of the disease), namely: “that the essential characteristics of true croup consist in an inflammation of the secreting surfaces of the fauces, larynx, and trachea, which is always productive of a membranaceous or an albuminous exudation.”

“2. That the membranaceous concretion, which is found coating the inflamed mucous surface of the parts in croup, is an

\* Boston Med. and Surgical Journal, vol. xlii. pp. 267-8.

exudation, not from the membrane itself, but is secreted by the muciparous glands, which so abundantly stud the larynx and trachea.

"3. That the exudative inflammation commences, invariably, in the superior portion of the respiratory passages, and extends from above downwards, never in the opposite direction." \*

Since the publication of the work in which this mode of treatment is advocated, the author has had the opportunity of treating many cases of croup on the plan deduced from this view of its pathology, viz: by means of topical medication, not only in his own practice, but in the practice of, and in conjunction with, other members of the medical profession; and with an amount of success that has afforded a high degree of encouragement and satisfaction.

He has also received from medical men, in different parts of the United States, as well as from numbers in Europe, the history of many cases of membranous croup, wherein topical measures, in their hands, have proved effectual in arresting the disease.

#### 4th. *The Effects of the Applications of the Nitrate of Silver in the Treatment of Œdema of the Glottis.*

In 1852, a work "*On the Surgical Treatment of Polypi of the Larynx, and Œdema of the Glottis*," was published by the author, in which cases of the latter disease are reported as having been successfully treated, as early as 1849, by means of a solution of the nitrate of silver to the affected parts. The happy result which had followed its employment, encouraged the author to commend with much confidence, this method of treating one of the most formidable, and hitherto one of the most fatal of all the diseases of the larynx.

In a paper read before the Edinburgh Medico-Chirurgical Society, by Dr. John Scott, one of the oldest and most distinguished physicians of Edinburgh—a paper which was afterwards published in the *Monthly Journal of Medical Science* for 1850—many interesting cases of laryngeal diseases, successfully treated by topical treatment, are recorded. Among the

\* Observations on the Pathology of Croup, with Remarks on its Treatment by Topical Medications, &c.



cases reported by Dr. Scott is one, the particulars of which were furnished him by his friend, Dr. Brown of Edinburgh ; which appears to have been a case of œdema of the glottis, following, or being complicated with inflammation of the mucous membrane of the parts. The patient was recovering from an attack of erysipelatous sore throat, when Dr. Brown was sent for, the message being that the patient was dying. "Meeting fortunately with Dr. Scott," says Dr. B., "he accompanied me. The patient had all the appearance of imminent death ; his face expressive of extreme terror and anguish ; the extremities cold ; the pulse hardly to be counted from its rapidity and weakness ; the breathing all but impossible, apparently from some affection at the top of the windpipe ; the voice was gone. On looking deeply into the throat, the pharynx and top of the larynx were seen of a deep red.

"The patient being too weak for bloodletting, and too ill for any slower measures of relief, Dr. Scott applied the solution of the nitrate of silver, which he happened to have with him. He got the sponge completely into the larynx. Mr. S. almost instantly expressed, by signs, his relief. In the evening he could speak a little, and was able to lie down in bed, and was in all respects better. He was blistered, and had calomel and opium.

"Next morning he was much better. The sponge was again applied without any difficulty. He recovered rapidly, and has been for more than two years in perfect health, attributing without any hesitation, the saving of his life to the sponge and the caustic."

The valuable work of Dr. Watson contains his views with regard to the effects of nitrate of silver in the œdematous glottis, together with a record of several cases successfully treated by this remedy ; and he expresses the gratification that he has been able to "come to precisely the same conclusions with myself, as to the strength and mode of application of the solution," in the management of this disease. He therefore quotes from my work the following directions, which are to be pursued in the employment of this remedy.

"The first application with the sponge-probang should be made to the pharynx and top of the epiglottis ; and after a

delay of ten or fifteen minutes, the measure may be repeated, and the sponge, wet with the solution, be freely applied to the base of the epiglottis and over the œdematous lips of the glottis. The application should be repeated every hour or two hours, according to the urgency of the disease, and the effect produced by the operation; and an attempt should be made each time to carry the sponge between the lips of the glottis. As the œdema at the opening of the larynx subsides, this may be done, and the application of the caustic solution be made to the interior of the glottis.

"I am inclined to think that the benefit arising from such a practice is brought about by the powerful stimulation of the relaxed vessels of the œdematous organ. Such a condition of the bloodvessels permits a continual increase of the morbid state, whereas, by their contracting under the stimulation, the current of blood within them is quickened, and the effused fluid is partly absorbed into the circulating fluid, partly removed by the new layer of epithelium, which is rapidly found to replace what had perished during the inactivity of the basement membrane, coincident with, and produced by the œdema of its subjacent tissue. Every touch of the probang renews the impulse already given to these restorative processes, and thus the benefit increases in a geometrical ratio, till the cure is finally accomplished."\*

"The action of a solution of caustic," says Dr. W., on another page, "applied to a sub-acutely inflamed mucous membrane, might, *a priori*, be expected to produce a beneficial effect on the œdematous glottis; and this expectation has been remarkably fulfilled in my experience."†

#### 5th. *Of the Effects of Nitrate of Silver in the Treatment of Hooping-Cough.*

To Professor Watson, of Glasgow, belongs the honor of having been the first to employ topical medication for the treatment of Hooping-Cough. His original paper on hooping-cough, in which he describes, "a new method of treating that disease," was read before the Medical Society of Glasgow, in

\* Watson, pp. 57, 58.

† *Ib.*, pp. 54, 55.

1849, and was first published in the *Edinburgh Monthly Journal* in December of the same year. Five years later—after having treated many other cases by this new method, Dr. Watson publishes, in his work on *Topical Medication*, the results of his experience; and these practical results have been considered in the highest degree encouraging. He has also given us, in this chapter on the laryngeal treatment of hooping-cough, the experience of *M. Joubert*, of France, who has employed, with great success, this topical method of treatment, in a large number of cases of hooping-cough. His memoir on the subject was published in a French journal, in 1851.\*

In the opinion of Dr. Watson the indications for the topical treatment of hooping-cough are founded upon what is considered by him the true pathology of the disease. The morbid agent, he thinks, whatever that poison may be, "in the cases of hooping-cough commences its operations by producing inflammation of the pharyngo-laryngeal mucous membrane; and secondarily, irritation of the pneumogastric nerves."† And hence the declaration of his belief that topical treatment alone "is founded on the true pathology of the disease, and is fitted to counteract, the most speedily and effectually of all known means, the results of the mysterious poison which originates the malady."‡

In the early stage of the disease, when the inflammatory action is high, Dr. Watson recommends, for children, the employment of a solution of the nitrate of silver, of the strength of about fifteen grains to the ounce of water.

"Afterwards, when the nervous symptoms predominate, the solution may with advantage be strengthened; but it is impossible to lay down rules that will universally apply to different cases, or even to the same case on different days. This must be left to the judgment of the practitioner."§ It is recommended that the applications should be made at least every second day, first to the pharyngo-laryngeal membrane, then to the parts above the glottis, and to the opening of the glottis. "But after the general inflammatory state has been got rid of,"

\* Recueil des Travaux de la Société Médicale de l'Indre et Loire. 1851.

† Op. citat., p. 107.

‡ Ib., p. 106.

§ Ib., p. 116.



says Dr. Watson, "and when the disease has come to its height, the larynx must be entered, in order that the caustic may be brought into contact with the nerves, upon the excitement of which the continuance of the hoop depends."\*

The following favorable numerical account is given by Dr. Watson, of the results of the treatment in question, in his own cases, and in those of M. Joubert; the number of patients treated amounts to 134 in all:—

	Cured within a fortnight	Cured within 3 or 4 weeks.	Resisted treatment.	Total.
Dr. Watson's cases . . .	46	20	0	66
M. Joubert's " . . .	40	20	8	68
	<hr/> 86	<hr/> 40	<hr/> 8	<hr/> 134

During the Spring of 1854, whooping-cough prevailed in Glasgow as an epidemic, and Dr. Watson had an opportunity of treating a large number of cases. In the most of these the disease was very severe; and yet the result as given is as follows: cured in a fortnight *ten* cases; in three weeks *sixteen*; in four weeks *five*; *one* resisted the treatment; and *one* died.

The whole number treated being therefore 167, the proportions stand thus:—

Cured in two weeks . . . . .	96 cases, or	51.4 per cent.
" three to four weeks . . . . .	61 " or	36.5 "
Resisted treatment . . . . .	9 "	
Died . . . . .	1 case, or nearly	0.06 "

In contrast with the preceding results of the topical treatment of whooping-cough, Dr. Watson subjoins a table of the ordinary duration of the disease when treated in the usual manner, as stated by some of the best and most recent authorities, such as Williams, Copland, Walsh, West, and a few others; and the average of all the statements of these authors, is from one and a half to three and a half months.

The deaths from whooping-cough in London (and the percentage appears to be about the same in other parts of Great Britain), according to the reports of the Registrar-General, are in the proportion of 8.9 per cent. among females, and 6.2 per cent. among males to the deaths from all causes under ten years of age.

"Surely, then," adds Prof. Watson, "a treatment which prom-

\* Op. citat., p. 118.

ised to diminish, or perhaps to annihilate this great mortality, ought to have been received with consideration by the profession," for, as the author subsequently remarks, "the numerical results just given prove in a manner beyond all cavil, the simple treatment which I have suggested is capable of cutting short the whooping-cough with as much certainty as quinine arrests an intermittent fever; and moreover, that it renders the disease while it lasts both milder in type, and safer to the patient than the most favorable circumstances of season or epidemic could possibly do." \*

So far as your Committee has been able to learn, it is ascertained that this topical method for the treatment of whooping-cough has been employed only to a very limited extent in this country. During the last four years every case of whooping-cough which has occurred in the practice of the chairman of your Committee (and they amount to a considerable number of cases), has been treated by applications of a solution of nitrate of silver to the pharyngo-laryngeal mucous membrane. In all these instances, the peculiar symptoms of the disease, the spasmodic cough and hoop, have been arrested in from one to two weeks; and in several cases which occurred last Winter, the hoop ceased entirely after the third application of the remedy: the cough, also, disappeared in a short time after. So far, then, as the experience of your Committee goes, it substantiates fully the favorable results obtained by Watson and Joubert.

Although to Dr. Watson has been awarded the honor of being the first who employed topical medication for the treatment of whooping-cough, still it would seem to be not inappropriate here to explain, as Dr. Watson has himself done, with great candor and fairness, "the way by which he came to try" this method of topical applications for the treatment of the disease in question. "Soon after the publication of Dr. Horace Green's work on *Diseases of the Air-passages*," he observes, "I had several opportunities of putting to the test of experience his method of treating chronic laryngeal affections, viz: by touching the lining of the larynx with a solution of the nitrate of silver. My trials fully confirmed his statement of the efficacy

\* Op. citat., p. 124.

of the treatment referred to, and I soon found that I could with advantage carry out a similar practice in many other diseases, such as in ordinary acute bronchitis, in the intervals of asthma, and even with relief of the tickling cough in early phthisis. Having thus established, to my satisfaction, the efficacy of a topical application of caustic solution in cases not only of chronic disease of the larynx but in all cases of inflammatory irritation of the glottis, I came to the conclusion that it might operate beneficially in the whooping-cough ; and, after a pretty extensive trial, I have not been disappointed.”\*

In closing this interesting chapter on topical medication, in whooping-cough, Dr. Watson expresses the hope that the day is not distant when the treatment, “so well described by these excellent writers, and the usefulness of which,” he says, “I have now been enabled to establish, not only by its results in my own practice but also in that of M. Joubert, will be more favorably received in this country, and more generally adopted by British practitioners of medicine ;” a hope which, by my own experience, I have been led most sincerely to entertain with regard to the practitioners of my own country.

#### 6th. *Of the Effects of Nitrate of Silver in the Treatment of Spasmodic Asthma.*

If the histological observations of some recent pathologists be correct with regard to the nature of spasmodic asthma, it might be anticipated, *a priori*, that the application of a solution of nitrate of silver to the affected parts, would produce a most beneficial effect on the disease ; and so far these expectations, in the experience of all those who have tried this remedy, have been entirely fulfilled. It is well known that there are only certain points in the course of the air-tubes at which a spasm can occur sufficient to produce the dyspnoea that takes place in asthma, and these portions are where the contraction of muscular fibres is not prevented by the existence of cartilaginous rings ; the principal points are at the extremities of the bronchial tubes, and at the rima glottidis. Williams, in his work on the *Pathology and Diagnosis of Diseases of the Chest*, expresses the

\* Monthly Journal of Medical Sciences, Dec. 1849, p. 1290.

opinion that the contraction of the former, "the bronchial muscles, is a sufficient cause of spasmodic asthma."\* Dr. Hastings believes that the constriction occurs in the larynx,† and Dr. Watson declares that the constriction in the minute bronchi cannot satisfactorily explain the complete stoppage of the breathing which occurs in the paroxysm. For this it seems absolutely necessary to assume that closure of the glottis likewise takes place on these occasions.‡

Founded on these views of the nature of this disease, the last two named authors have adopted the plan of topical medication, in spasmodic asthma, and this treatment in their hands has been attended with complete success.

"In spasmodic asthma," Dr. Hastings remarks, "percussion elicits a tolerably clear sound from the thoracic walls. On applying the ear or the stethoscope below the clavicles, sibilant and sonorous rattles are heard. These diminish as we proceed in the examination towards the abdomen, but increase as we pass upwards towards the neck, and over the trachea or larynx their greatest intensity is evident, which region is, moreover, the real seat of the disease. The sounds heard in the chest are transmitted from this part, and this fact admits of ready demonstration.

"If a sponge soaked in a solution of the nitrate of silver be passed over the diseased surface, and the chest be examined immediately afterwards, the sibilant and sonorous rattles will have partially or entirely disappeared, and those of the laryngeal region become so much diminished that they cannot be propagated into the tubes within the lungs. Yet how repeatedly have I seen such patients with their chests cupped, leeched, and blistered!"§

Several interesting cases of this disease are recorded by Dr. Hastings as having been successfully treated by topical medication. In one instance, the applications of a solution of the nitrate of silver failed to effect a cure when the author substituted a saturated solution of the bichanuret of mercury in distilled water, under the use of which, and of light tonic com-

\* Pathology and Diagnosis of Diseases of the Chest, &c., p. 91.

† Op. citat., p. 66.

‡ Op. citat., p. 127.

§ Ib., p. 66.

bined with nitric acid, the patient rapidly improved, and was restored to permanent health.\*

"The state of the larynx," says Dr. Watson, "in spasmodic asthma, has not hitherto received adequate attention either from pathologists or physicians; in this opinion he expresses himself fully confirmed, that a morbid contraction of the larynx is a frequent cause of the disease, and that a spasm of the glottis dependent upon a lesion of this organ, constitutes an essential part of a fit of asthma.

On the subject of the treatment of this disease by local measures, Dr. Watson remarks: "I am far from wishing to laud the topical applications beyond what they deserve, but I am sure any medical practitioner will bear me out in saying, that the ordinary treatment of asthma, by bleeding, general or local, by emetics, antispasmodics, opiates, and mercurials internally, with blisters and various other counter-irritants externally, has seldom been followed by even a partial success in these cases." "There is here, therefore, an evident blank in therapeutics, for no agent hitherto proposed has been found capable (says Dr. W.) of removing or greatly diminishing this morbid contractility of the air-tubes."† A solution of caustic, in the opinion of the author, "applied to the interior of the larynx, supplies this defect, fills up the blank." And he has recorded in his work many severe cases of spasmodic asthma, successfully treated, in the management of which no other means were employed, "but the regular application of caustic to the affected parts, at first every day, and afterwards every second day."‡ In the last edition of my work on "*Diseases of the Air-Passages*," several cases of spasmodic asthma are recorded, in the treatment of which cauterizations were employed with entire success; it has been, therefore, a cause of gratulation, that the statements of your Committee, with respect to the efficacy of the treatment have been fully confirmed in the experience of these distinguished practitioners.

Since we commenced drawing up this report, a new work, *On the Local Treatment of the Mucous Membrane of the Throat, for Cough and Bronchitis*, recently published in London, by J.

\* *Ib.*, pp. 68-9

† *Op. citat.*, pp. 134-6.

‡ *Ib.*, p. 132.



E. Riadore, has been received. This work, in which topical medication for the treatment of many affections of the air-passages is advocated, contains nothing particularly new or important on this subject. The only novel suggestion made by the author, is one respecting the *temperature* of the solutions to be employed in local treatment. In spasmodic asthma, particularly, the author urges the employment of a *hot* solution of nitrate of silver. Indeed, he advises that, "in all spasmodic cases of the organs of the throat, the remedial appliances—the solutions—should be made hot, and used as warm as they can be borne."\*

7th. *Of the Effects of Nitrate of Silver employed as a Topical Remedy in the Treatment of Tuberculosis, following or complicated with Bronchial Inflammation.*

Ten years ago, in 1846, in a work to which I have before alluded (*On Diseases of the Air-Passages*), topical applications of the nitrate of silver were recommended to be employed in the treatment of Tuberculosis. On page 260 of this work is the following declaration: "Among the cases of laryngeal and bronchial affection, which, during the year 1845, came under my care, twenty-five presented decided symptoms of pulmonary phthisis, complicated with follicular disease. As the pulmonary symptoms, in a majority of the cases, had supervened upon the original glandular affection, topical measures were employed—not with the expectation of their proving ultimately remedial, but with the hope of deferring the pulmonary, by allaying the laryngeal disease; and the success which has attended these efforts in a majority of the above cases in mitigating the sufferings and in prolonging the lives of my patients, has been to me a source of the highest gratification."

This proposition to treat a general disease by local measures, was not at that time received with favor by the medical profession. And yet the plan has since been adopted by large numbers of the intelligent portion of the profession in our own, and in foreign countries, who have given the highest testimony in its favor. Not only is laryngeal inflammation present in varying degrees of intensity in the early period of

\* Ut supra, p. 96.

tuberculosis, but recent histological observations have fully established this pathological fact, that in all cases of tubercular deposit, there occurs in the immediate vicinity of the exudation more or less of an inflammatory action, in which all the adjacent structures are involved. The bronchial membrane and the pulmonary parenchyma become at once congested, and subsequently inflamed. The terminal extremities of the bronchi, says Prof. Bennett, are among the first structures affected, and as the tuberculosis proceeds, all the appearances characteristic of chronic bronchitis are produced, and are constantly going on in the progress of a case. "Consequently," he observes, "the great problem to be worked out, in the treatment of pulmonary tuberculosis, is that while, on the one hand, it is a disease of diminished nutrition and weakness, and consequently requires a general invigorating and supporting system of treatment, on the other, it is accompanied by local excitement, which demands an antiphlogistic and lowering practice." \*

It is to meet this last indication, to subdue the local inflammatory action in the immediate vicinity of the exudation—an action which, if continued, will not only effectually prevent the disintegration and absorption of the tubercular mass already formed, but which will tend to augment the mass—that applications of the nitrate of silver solution to the congested and inflamed membrane, are advised in early, as well as in advanced tuberculosis.

Dr. Hastings, in his *Treatise on Diseases of the Larynx and Trachea*, has devoted a chapter to the subject of the topical treatment of tubercular, when complicated with laryngeal disease. In the earliest stage of this affection, "it should be met," says Dr. Hastings, "by the most vigorous treatment, and I know of no means so capable of arresting or removing it, as sponging the windpipe with a solution of the nitrate of silver." † Several cases are narrated by this author, which were successfully treated by this plan, one of which, as it is that of a surgeon of the army, and is of great interest, I shall take the liberty of giving, abbreviated. This surgeon "returned from India, in 1846, on sick certificate, having suffered for about two years

\* Op. citat., p. 68.

† Op. citat., p. 130.

previously from pulmonary disease. On leaving India, the symptoms were as follows: Cough, with copious muco-purulent expectoration, occasionally mixed with blood; frequent pain in the upper portion of the left chest, increased on deep inspiration; much prostration of strength, and considerable emaciation." \*

After his return home he improved somewhat in health and strength, up to October, 1847, when he was suddenly attacked with acute inflammation of the left lung. From this attack he gradually recovered sufficiently to go to London, in 1848, for the purpose of consulting Dr. Hastings. About a week after his arrival he was again attacked with acute inflammation of the lungs, in which the larynx and trachea were involved. "At the commencement of this attack," says the patient himself, "the symptoms were as follows: Pains in the clavicular portion of the left side of the thorax, extending downwards; hurried and difficult respiration; inability to expand the chest, almost in the slightest degree, also when lying on the left side and back; quick pulse; much prostration of strength and extreme emaciation. I derived the greatest and almost immediate relief, when suffering from difficulty of breathing, from having the larynx and trachea sponged with a solution of the nitrate of silver. This attack gradually yielded to the treatment employed, when I was put on a course of the pyroacetic spirit, and cod-liver oil.

"This treatment has been continued at intervals ever since, and to which I may attribute my restoration to my present state of health."

Dr. Hastings adds: "The writer of the above was, when he consulted me, about two years and a half ago, under forty years of age, and weighed 10 st. 6 lbs.; he now weighs 11 st. 4 lbs. When I first saw him, he had a large gurgling cavity in the upper lobe of the left lung; two or three of his medical friends laughed at the bare idea that any substantial good could be done for him. After completely removing the inflammation in the larynx and trachea, by sponging that passage twice a week with a solution of the nitrate of silver for three months, the

\* *Ib.*, p 130.



disease in the lungs appeared gradually and steadily to diminish ; and although at Christmas last, and for some time previous, he had lost all the general symptoms of phthisis, the cavity, which then was dry, and much smaller, was however still very evident. But now it has entirely disappeared—slight bronchopony is heard over its former seat, and more or less imperfect respiratory murmur exists in the upper portion of the lung, with considerable flattening of the superior part of the left chest.” \* \* \* \*

“ My object for inserting this case here is for the purpose of showing the great advantage to be derived from sponging the laryngo-tracheal tube with the nitrate of silver, in the early stage of tubercular laryngitis.” \*

Still more extensively has Prof. Watson considered this subject ; the employment of local treatment in tuberculosis ; and he has recorded several most instructive cases, in which the larynx was advantageously treated by topical means, in both incipient and advanced pulmonary phthisis.

In combination with, or to be followed by appropriate general remedies, he urges the importance of the use of applications of nitrate of silver to the larynx, in all those incipient cases of phthisis in which the cough is caused by actual laryngitis, by the irritation produced by the passage of bloody sputum ; or by secondary nervous irritation of the larynx. The cough in these cases, he declares, “ is not simply a symptom in the ordinary acceptation of the term ; it is itself a disease, the result of organic change in the larynx, which increases the pulmonary affection. In treating the larynx, therefore, with a view of diminishing the cough, the physician is not to be looked upon as irrational, but on the contrary, as aiming his remedial measures at the very source of much of the distress of the patient and of the fatal progress of the disease.” †

No unprejudiced person can read the testimony embodied in the cases reported by Dr. Watson, without having the conviction forced upon him, that in many of these instances of early tuberculosis an arrestment of the pulmonary disease was brought about by the measures adopted. Not that the author would

\* Op. citat., pp. 131-133.

† Op. citat., p. 168.

represent these cases as positively cured, "for undoubtedly," he remarks, "the tendency to tubercular disease still remains in the constitution, though its local manifestation has ceased to exist." \* \* "Formerly," he continues, "there was positive evidence of an actual consumption; now, there is no such evidence, but on the contrary, all the signs and symptoms of perfect health." \* Some may doubt the relation of the topical treatment to the successful issue in these cases, says Dr. Watson, but no one can fail to perceive, "that the cough first abated as the laryngeal irritability was removed, then the general health improved, and *sometime afterwards*, the pulmonary condensation was found to have disappeared." \*

In the advanced stage of phthisis, in which the cough is caused or aggravated by laryngeal ulcers; or, in which the passage of purulent sputum produces laryngeal irritation, topical applications, says Dr. Watson, although they cannot be considered in the light of *curative* means, "ought nevertheless to be practised whenever the patient can bear them, as the surest and best means of relieving him from the pain and distress which are caused by the state of the larynx; and when cautiously pursued, even in such cases, I have known more than one life prolonged for months and even years." †

Dr. Cotton also, in his work on consumption, recommends the topical application of nitrate of silver to the larynx, especially in the early stage of the disease. "I would not advise it to be practised, however," says Dr. Cotton, "when the pulmonary disease is in a *very* advanced stage, and the strength of the patient much exhausted." Its use by him is restricted to the early period of the disease, when the lungs are not much affected, nor the strength of the patient reduced; it is this stage, he says, which presents the most promising opportunities for its employment.

The testimony of Dr. A. Scott Alison, in his treatise on the *Medication of the Larynx and Trachea*, is decidedly in favor of the employment of the nitrate of silver, in the treatment of that cough and irritation of the glottis, which are dependent upon the presence of tubercles in the lung. "Much comfort and

\* Op. citat., p. 172.

† Ib., p. 180.

benefit," he says, "have been derived from its use, both when the tubercles have been crude, and when they have become softened. The presence of undoubted cavities in the lungs, the breaking down of tubercles, and the expulsion of their débris, have not prevented this application from being decidedly useful."\*

Prof. Robert B. Todd, Physician to King's College Hospital, London, who has had much experience, in the treatment of pharyngo-laryngeal and bronchial diseases, by topical medication, has embodied in his "Clinical Lectures," recently published in the *London Medical Times and Gazette*,† some of his views, and recorded his experience in relation to this subject. In the treatment of these affections, he employs and recommends "the local application of a solution of nitrate of silver (3ss to the ℥j), by means of a probang thrust behind the epiglottis down to the glottis, on the plan of Dr. Horace Green, of New York." "The patient," he says, "can always tell whether the sponge enters the larynx or not, from the great irritation it excites when it passes into the glottis; and in the withdrawal of it, the operator feels a certain resistance caused by the sponge being grasped by the muscles of the larynx, which resistance is not felt when it simply passes into the œsophagus."‡ In one case reported by Dr. Todd, in which the symptoms indicated confirmed tubercular disease of the lungs, complicated with chronic thickening of the mucous membrane of the larynx and epiglottis, with ulceration of the chordæ vocales, and of the ventricles of the larynx. applications of a strong solution of nitrate of silver to the diseased parts, tended invariably greatly to relieve the extreme irritability of the larynx, for "the patient always expressed herself as much better after each application, and her pain was relieved, although only temporarily." But in the milder forms of the disease, the topical treatment often proved permanently beneficial; for Dr. Todd assures us, that he "could tell of numerous instances of coughs of the most troublesome kind, and of long duration, that had resisted all the ordinary cough medicines, and which had

\* Medication of the Larynx and Trachea, &c., p. 8.

† Medical Times and Gazette, No. 139, p. 207.

‡ Ib., p. 210.

yielded to three or four applications of the nitrate of silver."

Persons laboring under such symptoms as these, he declares, are often treated for bronchitis, and take large quantities of expectorant and other medicines, for the relief of the cough. The seat of the irritation, upon which the cough depends, is thought to be in the bronchial tubes, and its real position (the fauces) is overlooked.\*

I have already alluded to the experience of Prof. Bennett, of Edinburgh, in the use of local applications for the treatment of those laryngeal diseases which, he assures us, are frequently mistaken for, or associated with, pulmonary tuberculosis. Dr. Bennett closes his valuable work on the pathology and treatment of pulmonary tuberculosis by the following practical conclusions :—

"1st. That not unfrequently diseases, entirely seated in the larynx or pharynx, are mistaken for pulmonary tuberculosis.

"2d. That even when tuberculosis exists, many of the urgent symptoms are not so much owing to disease in the lung, as to the pharyngeal and laryngeal complications.

"3d. That a local treatment may not only remove or alleviate these complications, but that, in conjunction with general remedies, it tends in a marked manner to induce arrestment of the pulmonary disease."†

And here, the duty of the commission appointed to report to this Association "on the use and effect of applications of nitrate of silver to the throat," may be considered as fulfilled, and their work accomplished.

It was our intention, however, to have illustrated the great value of this therapeutic agent, in the treatment of the different forms of disease, to which we have referred, by the history of cases which have fallen under our own observation, which would have corroborated fully the favorable reports made by the preceding authors. But this paper is already sufficiently extended. Justice to this subject, however, would not be done, should we fail to allude altogether to the success, which, during the last eighteen months, has attended the still further extension of top-

\* Op. citat., p. 209.

† Ib., p. 142.

ical medication, in the treatment of thoracic disease, effected by means of the operation of *catheterism* of the air-passages, or the injection of a solution of the nitrate of silver into the bronchial divisions.

During the last eighteen months, or since October, 1854, over one hundred patients, embracing cases of both pulmonary and bronchial disease, have been treated by this form of topical medication, conjoined with appropriate general remedies. The history of this plan of treatment and the result of the practice, results which have been in a high degree satisfactory, have been brought before the profession in papers read before the New York Academy of Medicine; before the State Medical Society of New York; and, more recently, a detailed report, embracing a statistical table of one hundred and six cases, thus treated, was published in the pages of the *American Medical Monthly*. Besides their publication in this country, most of these papers have been reprinted in some of the medical publications of Great Britain, and have also been translated and republished in a few of the leading journals of France. It will therefore be unnecessary to bring the whole subject before the Association; and we shall close the present report by a brief analysis of the cases embraced in the statistical table, which, with the history of many of these cases, may be found in the *American Medical Monthly* for March, 1856.

Of one hundred cases of thoracic disease treated by catheterism of the air-passages, seventy-one of the sum total are recorded as cases of *tuberculosis*. Of this number, *thirty-two* were considered cases of *advanced phthisis*—cases in which tubercular cavities were recognized in one or both lungs; and *thirty-nine* cases of *early phthisis*. Of the first division—advanced phthisis—fourteen have since died. *Twenty-five* were more or less improved; their lives being apparently prolonged by this method of medication. *Seven* only of the thirty-two cases of advanced phthisis were not benefited by the injections.

Of the *thirty-nine* cases of incipient tuberculosis, twelve of this disease have apparently recovered. Five more of this number are now, or were, at the time of making the report, in the enjoyment of a good degree of health. With respect to



the above twelve cases, I say *apparently* cured ; for, although the appearance of these patients, as manifested both by the physical and rational signs, is indicative of an ordinary degree of health, yet in a disease like that of tuberculosis, every medical man is aware that one year is a period too brief to speak decidedly with regard to the positive and final result.

Of the remaining *twenty-two* cases, many of whom, at the time of the report, were still under treatment, *seventeen* had been greatly improved by topical medication ; three more had been moderately benefited ; while *three* only had failed to obtain any advantage from the local measures which had been adopted.

Of the *twenty-eight* cases of *bronchitis*, sixteen had been dismissed cured, or so much improved as to require no further treatment. All others had been greatly benefited, although some were still under treatment at the time of making the report.

Finally, in view of all that has been accomplished by topical medication, the chairman of the Committee would reiterate the declaration made in the first paper communicated to the professional public on this subject, that, "the results of this method of treating disease, whether it has been employed in bronchial affections, or in the commencement of tuberculosis, have already afforded the most gratifying indications that practical medicine will be greatly advanced by this discovery."\*

\* American Medical Monthly, Jan. 1855, p. 25.









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